

METHOD AND APPARATUS FOR COMMUNICATION WITHIN A VEHICLE DISPATCH SYSTEM

Background of the Invention

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Field of the Invention

This invention relates in general to vehicle dispatch systems, and in particular to the communication of assignment messages within vehicle dispatch systems.

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Description of the Related Art

A number of vehicle dispatch systems exist for the tracking and controlling of fleets such as taxicabs, delivery trucks, and the like. These systems typically communicate requests for dispatch to the vehicles in the fleet and then match acceptance of the request to the particular request. Key criteria of vehicle dispatch systems, whether manual or automatic, simple or complex, include the system cost, the system performance, and the fairness and timeliness of the selection process.

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Historically, two-way radio networks have been utilized for vehicle dispatch. Voice communication is the primary communication tool for information gathering and decision making relating to the distribution of assignments in these systems. A dispatch center broadcasts a message of a new assignment location either via a data network or a voice network to the drivers of the various vehicles in the fleet; and each individual driver replies with his/her acceptance or rejection of the assignment to the dispatch center. Typically, the driver's reply is accomplished via a voice network such as a cellular phone or two-way radio.

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There are several drawbacks to these vehicle dispatch systems. First, the driver must be alert at all times to listen to the assignment messages from the dispatch center and rapidly determine if the assignment location is within his/her range. The driver must make a quick decision for each message of whether to accept the job or not. In some fleets, if the driver affirmatively replies to the dispatch center and then does not get to the assignment location within a pre-

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determined amount of time he can be fined. The combination of the rapid assignment messaging and decision-making and the potential for fines creates high stress levels in the drivers of the vehicles.

5 A second drawback of the traditional vehicle dispatch systems is that some of the drivers will answer any call, even if not close to the assignment location, motivated by a desire to maximize income or challenge the system. This creates an environment wherein the customer suffers from not receiving the most rapid service. Further, drivers from competing fleets can monitor the frequency of message transmission with a scanner and "steal" the assignments from the drivers
10 who the message was targeted to reach.

Further, the broadcast of the assignment message in traditional vehicle dispatch systems is made throughout the entire territory covered by the fleet. In areas where there is a shortage of radio frequency channels, the available channels are rapidly filled to capacity. The expense of maintaining existing
15 channels and/or petitioning the local government for new channels can be out of reach for many dispatch businesses.

Today, vehicle dispatch systems designed to alleviate some of the previously described drawbacks typically focus communications and decision-making at the dispatch center. Information such as geographical location and
20 current job status of a selected vehicle is established; and then decisions regarding sending the current dispatch message to that selected vehicle are made by comparing that information either manually or automatically to some pre-defined criteria in the dispatch center. Automatic vehicle locator systems that automatically track the location of managed vehicles and then report this
25 information to a dispatcher are frequently utilized. Advanced automatic vehicle locator systems further automatically identify the nearest vehicle to a location to further facilitate the dispatcher's accuracy. In some systems, the geographical location is compared to known locations of authorized vehicles and dispatch of the message is denied to the selected vehicle if the selected vehicle's location does
30 not correspond to one of the known locations.

Other vehicle dispatch systems automatically assign jobs to the closest available vehicle and then inform the driver of the assignment via some other channel, such as the driver's mobile pager. In this method, no assurance is given

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that the driver receives the notification or is actually available to take the assignment. The driver actually has no method to decline the assignment in this type of system.

The drawback of all of these systems is that the control rests within the dispatch center completely and the complexity of the system communications is increased greatly. Further the channel utilization increases since each call must be sent individually to each selected driver. Lastly, the systems still rely heavily on the dispatcher to make decisions and perform monitoring of the vehicles. This leads to a high degree of errors and confusion.

What is needed is a method to reduce the loading of the channels used for vehicle dispatch, reduce the decision-making stress on the vehicle drivers, and at the same time retain the automatic sorting mechanisms of the dispatch center - based systems.

Brief Description of the Several Views of the Drawings

FIG. 1 is a block diagram of a vehicle dispatch system;

FIG. 2 is an electrical block diagram of a wireless communication device for use within the vehicle dispatch system of FIG. 1;

FIG. 3 is an illustration of an assignment message for communication within the vehicle dispatch system of FIG. 1;

FIGs. 4, 5, and 6 illustrate various decision-making criteria for use within the wireless communication device of FIG. 2;

FIGs. 7, 8, and 9 are electrical block diagrams of alternate embodiments of the wireless communication device of FIG. 2;

FIGs. 10 and 11 are flowcharts illustrating the operation of the wireless communication device of FIG. 2 in accordance with the present invention;

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and

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the vehicle dispatch system of FIG. 1.

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Detailed Description of the Invention

Referring to FIG. 1, a vehicle dispatch system 10 for the management of a
5 fleet 12 of vehicles 14 such as taxicabs, delivery trucks and the like is illustrated.
The vehicle dispatch system 10 comprises a message input device 24, such as a
telephone or computer terminal, connected through a conventional public
switched telephone network (PSTN) 30 by a plurality of conventional telephone
links 26 to a dispatch center 16. It will be appreciated by one skilled in the art that
10 the message input device 24 may also communicate with the dispatch center 16
via alternative communication means such as radio frequency (RF) channels,
satellite links, or Internet.

The dispatch center 16 functions in a wide variety of manners ranging from
fully manual systems to automatic systems employing complex tracking methods.
15 The dispatch center 16 includes a dispatch controller 18, a dispatch transmitter
20, and a dispatch receiver 22. The dispatch controller 18 oversees the operation
of the dispatch transmitter 20 and the dispatch receiver 22 through one or more
communication links 42, which typically are conventional telephone links, and
additionally can include RF, microwave, or other high quality audio communication
20 links. The dispatch controller 18 encodes inbound requests for dispatch 28 into
outbound assignment messages 32, and decodes inbound replies 38 from the
vehicles 14 for matching of a request for dispatch 28 with a vehicle 14 that
affirmatively replies. The dispatch controller 18 preferably includes a timer 19 for
managing the scheduling of assignments. The dispatch controller 18 schedules
25 the assignment message 32 for transmission by the dispatch transmitter 20, via a
transmit antenna 34, to each vehicle 14 of the fleet 12 on at least one outbound
radio frequency (RF) channel such as a first communication channel 35. Each
vehicle 14 includes a wireless communication device 36 capable of receiving and
processing the assignment messages 32.

30 It will be appreciated that the vehicle dispatch system 10 may function
utilizing any wireless RF channel for the first communication channel 35, for
example, a one or two way pager channel, a mobile cellular channel, or a mobile

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radio channel. In the following description, the RF communication channel refers to any of the wireless RF channels listed above or an equivalent. Each wireless communication device **36** assigned for use in the vehicle dispatch system **10** has an address **48** assigned thereto, which is a unique selective call address. The address **48** enables the transmission of the assignment message **32** from the dispatch controller **18** only to the addressed wireless communication device **36**. The address **48** also identifies the replies **38** sent by the wireless communication device **36** over at least one outbound radio frequency (RF) channel such as a second communication channel **39**; and received at the dispatch controller **18** through the dispatch receiver **22** via a receive antenna **40**. A list of the assigned addresses for each of the wireless communication devices **36** is stored in the dispatch controller **18** in the form of a vehicle subscriber database.

FIG. 2 is an electrical block diagram of a wireless communication device **36** for use within the vehicle dispatch system **10** of FIG. 1. The wireless communication device **36** includes an antenna **44** for intercepting transmitted signals from the dispatch center **16** of the vehicle dispatch system **10**. The antenna **44** is coupled to a receiver **46** employing conventional demodulation techniques for processing the communication signals received from the dispatch center **16** such as the assignment message **32**. The receiver **46** is capable of receiving and demodulating voice as well as data signals.

FIG. 3 is an illustration of the assignment message **32** for communication with the wireless communication device **36** of FIG. 2. The assignment message **32** preferably includes an address **48**, a location parameter **50**, and a data **52**. The address **48** identifies the wireless communication device **36** for which the assignment message **32** is directed. The location parameter **50** identifies the geographical location of the assignment being transmitted in the data **52** of the assignment message **32**. The data **52** includes all details of the assignment such as customer name, number of passengers, the required time of pick-up, etc.

Referring back to FIG. 2, coupled to the receiver **46** is an assignment manager **58** utilizing conventional signal processing techniques for processing the received assignment messages. Preferably, the assignment manager **58** is similar to the MC68328 micro-controller manufactured by Motorola, Inc. of

Schaumburg, Illinois. It will be appreciated that other similar processors can be utilized for the assignment manager **58**, and that additional processors of the same or alternative type can be added as required to handle the processing requirements of the assignment manager **58**.

5 The assignment manager **58** is coupled to a memory **54** preferably including a random access memory (RAM), a read-only memory (ROM), and an electrically erasable programmable read-only memory (EEPROM). The assignment manager **58** decodes the address **48** in the received assignment message **32**, compares the decoded address with a device address **55** stored in a memory **54**, and when
10 a match is detected, proceeds to process the location parameter **50** of the assignment message **32**. The processing of the location parameter **50** by the assignment manager **58** comprises determining whether to delete the assignment message **32** or process the assignment message **32**.

 Coupled to the assignment manager **58** is a processor **60**. Preferably, the
15 processor **60** is similar to the MC68328 micro-controller manufactured by Motorola, Inc. of Schaumburg, Illinois. It will be appreciated that other similar processors can be utilized for the processor **60**, and that additional processors of the same or alternative type can be added as required to handle the processing requirements of the processor **60**.

20 Once the assignment manager **58** determines that the assignment message **32** should be processed, it sends the assignment message **32** to the processor **60**. Upon receipt of the assignment message **32**, the processor **60** stores the assignment message **32** in the memory **54**. The processor **60** also sends a command to an alerting device **64** to notify the driver of the vehicle **14** in which the
25 wireless communication device **36** is located that the assignment message **32** has been received. In one embodiment, the alerting device **64** comprises a speaker and associated speaker drive circuitry capable of playing both melodies and voice recordings. Upon receiving a command from the processor **60** to play a message receipt alert, the alerting device **64** plays an audible alert. The driver then chooses
30 to review the data **52** of the assignment message **32** on a display screen in the case of data messages or play the recorded voice message in the case of voice messages.

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The alerting device 64, in another embodiment, includes a display to generate a visual notification of the assignment message receipt. When the display receives the command from the processor 60 that the assignment message 32 has been received and stored in memory 54, a message indication is displayed. The message indication, for example may be the activation of one of a plurality of message icons. Selection by the driver of the message indicator associated with the assignment message 32 will display the data 52 of the assignment message 32 on the screen in the case of data messages and play the recorded voice message in the case of voice messages. Alternatively, the data 52 of the assignment message 32 is displayed on the display screen in response to a command from the processor 60 with no required input from the driver. The display may be, for example, a full or partial starburst liquid crystal display. It will be appreciated that other similar displays can be utilized for the display.

Preferably, the assignment manager 58 is programmed to include a criteria parameter 62 for comparison of the location parameter 50 of the assignment message 32 with a current location 56 stored in the memory 54. When the location parameter 50 corresponds to the current location 56, the assignment manager 58 passes the assignment message 32 to the processor 60 for message processing.

The criteria parameter 62 is a pre-set metric for filtering the assignment message 32 received by the wireless communication device 36 to be seen only by the vehicles 14 within the fleet 12 that meet the specified criteria. The criteria parameter 62 may be a calculation, an equation, a function, or a comparison value. The criteria parameter 62 may be changed in response to receipt of a programming message, in response to a timer timeout, or in response to a direct reprogramming of the assignment manager 58.

Utilization of a criteria parameter within an assignment manager included within a wireless communication device greatly reduces the burden of the vehicle driver by filtering out assignments automatically that are outside his/her current range of assignment acceptance. The criteria parameter is programmable and therefor may be changed by the driver or by the fleet manager as required. Further, by placing the decision within the vehicle, the dispatch center is alleviated

FIGs. 4, 5, and 6 illustrate various metrics for the criteria parameter 62. It will be appreciated by those skilled in the art that other metrics may also be used for the criteria parameter 62. In FIG. 4, the criteria parameter 62 is a perimeter 68 surrounding the assignment location 66 established at a radius 70 from the assignment location 66. When the wireless communication device 36 receives the assignment message 32 including the location parameter 50, the assignment manager 58 compares the location parameter 50 corresponding with the assignment location 66 to the current location 56 of the vehicle 14 in which the wireless communication device 36 resides. When the current location 56 is within the perimeter 68, the assignment message 32 will be sent to the processor 60 for further processing. When the current location 56 is not within the perimeter 68, the assignment message 32 will be deleted, and the driver of the vehicle 14 would never even be aware that it was received, thereby reducing unnecessary message receipt by the driver of the vehicle.

30 Preferably, the assignment manager **58** includes a navigation program for the area in which the fleet **12** operates. The assignment manager **58** uses the

navigation program to calculate the driving distance from the current location **56** to the assignment location **66**.

The filtering by driving distance and by perimeter from the assignment location eliminates problems of drivers affirmatively replying to assignment messages clearly outside their range for the purpose of maximizing their own income, thereby enhancing system performance and customer satisfaction.

In FIG. 6, the criteria parameter **62** is the travel time **78** equal to the difference between an estimated arrival time **74** and a current time **76**. Upon receipt of the assignment message **32**, the assignment manager **58** determines the estimated arrival time **74** to the assignment location **66**. The current time **76** is subtracted from the estimated arrival time **74** to calculate a travel time. When the calculated travel time is within the travel time **78** assigned to the criteria parameter **62**, the assignment message **32** will be sent to the processor **60** for further processing. When the calculated travel time is not within the travel time **78** assigned to the criteria parameter **62**, the assignment message **32** will be deleted and the driver of the vehicle **14** would never even be aware that it was received. This process thereby limits receipt of assignment messages by vehicle drivers to those that the driver could arrive at within a reasonable timeframe.

Preferably, the assignment manager **58** includes a smart program for tracking of traffic conditions coupled to the assignment manager **58**. The smart program calculates the travel time required based on the latest received traffic conditions. Alternatively, the assignment manager **58** may include a program incorporating average travel times and uses the average travel times to calculate the travel time from the current location **56** to the assignment location **66**.

The criteria parameter **62** alternatively further includes hours of operation for the vehicle **14**. The hours of operation in one embodiment are set by the driver of the vehicle at the beginning of each shift. Alternatively, the hours of operation are set either manually or automatically via the receipt of a message from the dispatch center. When the estimated arrival time does not fall between the hours of operation, the assignment message **32** will be deleted and the driver of the vehicle **14** would never even be aware that it was received.

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In another embodiment, the criteria parameter **62** is a type of vehicle that the driver of the vehicle **14** is using at that time. For example, passenger transportation fleets typically include limousines, cars, small cars, vans, and buses. When the location parameter **50** of the assignment message **32** is the number of passengers to be picked up and the criteria parameter **62** is the type of vehicle, the assignment message **32** is deleted if the number of passengers do not fit within that type of vehicle.

The examples above illustrate the variety of criteria parameter **62** programmed based on the type of fleet, type of business, and needs of the dispatch center. It will be appreciated by those skilled in the art that other metrics may also be used for the criteria parameter **62**.

FIG. 7 is an alternate embodiment of the wireless communication device **36**. The reference numbers of the embodiment of FIG. 2 have been retained for those elements that are common. The wireless communication device **36** of FIG. 7 includes all the elements and functionality illustrated in FIG. 2 and further comprises a transmitter **80** and a device transmit antenna **82**.

The transmitter **80** is coupled to the processor **60** and is responsive to commands from the processor **60**. When the transmitter **80** receives a command from the processor **60**, the transmitter **80** sends the reply **38** via the device transmit antenna **82** to the dispatch center **16**. The reply **38** in one embodiment is transmitted over the first communication channel **35**, the same channel used to communicate the assignment message **32**. Using the same communication channel for both sets of communications eliminates the need for multiple channels and is desirable in regions where there is a shortage of available channels. In another embodiment, the reply **38** is transmitted over the second communication channel **39**. Using a different channel for the reply reduces the traffic on the first communication channel and is desirable in regions where the communication channels are congested.

The reply **38** preferably includes an affirmative indication to the dispatch center that the vehicle **14** containing the wireless communication device **36** will fulfill the assignment contained within the data **52** of the assignment message **32**. The reply **38** preferably also includes a vehicle identification and the vehicle's

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FIG. 8 is an alternate embodiment of the wireless communication device 36. The reference numbers of the embodiments of FIGs. 2 and 7 have been retained for those elements that are common. The wireless communication device 36 includes all the elements and functionality illustrated in FIG. 7 and further comprises a user interface 86.

Use of the user interface **86** leaves the control of acceptance or rejection of an assignment message with the driver of the vehicle while still filtering assignment messages obviously outside of his/her area. This two step filtering process: the first being automatic by the assignment manager and the second being manual via the user interface, gives the driver of the vehicle control of the matching of assignments, an improvement over the dispatch center – based systems which eliminate all driver control of assignment matches.

The Global Positioning System (GPS) is a worldwide radio-navigation system formed from a constellation of 24 satellites and their ground stations. GPS uses these "man-made stars" as reference points to calculate positions accurate to a matter of meters. The GPS receiver **88** uses the satellites in space as reference points for locations here on earth. The GPS receiver **88** measures distance using

5 The GPS receiver **88** receives a plurality of signals **89** via the GPS antenna **90** corresponding to the current location **56**. The GPS receiver **88** is coupled to the memory **54** and stores the current location **56**, determined from the processing of the plurality of signals **89**, in the memory **54** for later use by the assignment manager **58** as described previously with regards to FIG. 2. The GPS receiver **88**
10 provides an accurate method for the wireless communication device **36** to determine the vehicle's current location.

FIG. 10 is a flowchart illustrating the operation of the wireless communication device 36 in accordance with the present invention. As indicated in step 92 of FIG. 10, the wireless communication device 36 is normally in the standby mode for optimal power savings. In Step 94, the wireless communication device 36 periodically checks for receipt of the assignment message 32. When no assignment message 32 is received, the wireless communication device 36 returns to the standby mode of Step 92. In Step 96, when the assignment message 32 is received, the wireless communication device 36 checks for the presence of the location parameter 50 in the assignment message 32. In Step 98, when no location parameter 50 is included in the assignment message 32, the wireless communication device 36 implements whatever default instructions have been programmed into the assignment manager 58 and the processor 60. The default instruction, for example, may be the processing of the assignment message, the deletion of the assignment message, or the sending of a query for more information from the dispatch center. In Step 100, when the location parameter 50 is included in the assignment message 32, the assignment manager 58 compares the location parameter 50 to the current location 56 stored in the memory 54. When the location parameter 50 does not correspond to the current location 56, the wireless communication device 36 goes back to Step 92, the standby state operation. In Step 101, when the location parameter 50 corresponds

Processing the assignment message **32** only upon a defined correspondence between the location parameter **50** and the current location **56** greatly reduces the assignment messages being received and processed by each individual driver. This automatic filter ensures the driver only is alerted to assignments in which there is a probability that he/she would be within the scope of the area of the assignment location.

FIG. 12 is a flowchart illustrating more detail of the operation of FIGs. 10 and 11. Moving from node B to Step 104, the system checks if the processor 60 is

programmed to generate an alert. In Step 103, when the processor 60 is programmed to generate an alert, the processor 60 sends a command to the alerting device 64 to do so. In Step 106, when no alert is required or after the alert is generated, the process checks for the presence of the transmitter 80.

- 5 When no transmitter 80 is present, the wireless communication device 36 returns to node A and the standby state of Step 92. In Step 108, when a transmitter 80 is present, the process checks if the processor 60 is programmed to require the user input 84 from the user interface 86 prior to sending a command to the transmitter 80. When the user input 84 is required, in Step 110, the processor 60 looks for
- 10 the user input 84. When no user input 84 is detected, the wireless communication device 36 returns to node A and the standby state of Step 92. When the user input 84 is detected in Step 110, the processor 60 generates the command to the transmitter 80 to reply to the original assignment message 32. In Step 112, the processor 60 checks for the presence of the second communication channel 39.
- 15 In Step 114, When the second communication channel 39 is present, the reply 38 is sent by the transmitter 80 over the second communication channel 39. The wireless communication device 36 then returns to node A and the standby state of Step 92. In Step 116, when the second communication channel 39 is not present, the transmitter 80 sends the reply 38 over the first communication channel 35 in
- 20 which the assignment message 32 was also communicated. The wireless communication device 36 then returns to node A and the standby state of Step 92.

- FIG. 13 is a flowchart of the operation of the dispatch center 16 for use within the vehicle dispatch system 10 of FIG. 1. In Step 118, the dispatch center 16 is in
- 25 a standby state. In the standby state, the dispatch center 16 reduces its operation to draw less current and require less power to operate. In Step 120, the dispatch center 16 periodically checks for receipt of the request for dispatch 28. When no request for dispatch 28 is received, the dispatch center 16 returns to the standby state of Step 118. In Step 122, when a request for dispatch 28 is received by the
- 30 dispatch center 16, the dispatch controller 18 of the dispatch center 16 generates the location parameter 50 identifying the assignment location 66 of the request for dispatch 28. In Step 123, the dispatch controller 18 sets the timer 19 for tracking

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the time for processing of the request for dispatch **28** to matching of the assignment with the vehicle **14**. In Step **124**, the dispatch controller **18** sets a criteria parameter counter to $N = 1$. In Step **126**, the dispatch controller **18** generates the assignment message **32**.

5 FIG. **14** illustrates one embodiment of the assignment message **32**. The assignment message **32** preferably includes the address **48**, the location parameter **50**, a criteria parameter **62** and the data **52**. The address **48** identifies the wireless communication device **36** for which the assignment message **32** is directed. The location parameter **50** identifies the geographical location of the
10 assignment being transmitted in the data **52** of the assignment message **32**. The data **52** includes all details of the assignment such as customer name, number of passengers, the required time of pick-up, etc.

 The criteria parameter **62**, as described previously, is a pre-set measurement for filtering the assignment message **32** received by the wireless communication
15 device **36** to be seen only by the vehicles **14** within the fleet **12** that meet the specified criteria. The criteria parameter **62** may be a calculation, an equation, a function, or a comparison value. The dispatch controller **18** generates the criteria parameter **62** to be sent in the assignment message **32**. FIGs. **4**, **5**, and **6**, previously described, illustrate various metrics for the criteria parameter **62**. It will
20 be appreciated by those skilled in the art that other metrics may also be used for the criteria parameter **62**.

 Referring back to FIG. **13**, in Step **128** the dispatch controller **18** sends a command to the dispatch transmitter **20** to transmit the assignment message **32** via the transmit antenna **34** to each vehicle **14** of the fleet **12** on the first
25 communication channel **35**. The assignment message **32** is then sent to the vehicles **14** of the fleet **12** which each receive the assignment message **32** using the wireless communication device **36**. In Step **130**, the dispatch center **16** checks for receipt of the reply **38** by at least one vehicle **14**. The reply **38** is received by the dispatch center **16** via the receive antenna **40** to the dispatch
30 receiver **22**. The dispatch receiver **22** informs the dispatch controller **18** of receipt of the reply **38**. In Step **132**, when the reply **38** has been received, the dispatch controller **18** resets the timer **19**. The dispatch controller **18** then completes the

09686672-101100

processing of the assignment match and then returns to Node **D** and the dispatch center **16** returns to the standby state of Step **118**. In Step **134**, when no reply **38** is received by the dispatch center **16**, the dispatch controller **18** checks for timeout of the timer **19**. When the timer has not timed out, the dispatch controller **18**

5 continues back to Step **130** periodically checking for receipt of the reply **38**. In Step **136**, when the timer **19** has timed out, the dispatch controller **18** sets the criteria parameter **62** to $N = 2$ which typically will relax the criteria to be used for matching the vehicle **14** with the request for dispatch **28**. The dispatch controller **18** then cycles back to Step **126** and generates the new assignment message **32**.

10 FIGs. **15**, **16**, and **17** illustrate various calculations of the $N = 1$ and $N = 2$ criteria parameters. In FIG. **15**, the criteria parameter **62** is first set at $N = 1$ to a first perimeter **140** surrounding the assignment location **66** at a first radius **142** from the assignment location **66**. The first radius **142** in one embodiment is chosen based on the time of day. For example, during peak hours the first radius

15 **142** is set to a smaller dimension than during non-peak hours. When the wireless communication device **36** receives the assignment message **32** including the location parameter **50** and the criteria parameter **62**, it compares the location parameter **50** corresponding with the assignment location **66** to the current location **56** of the vehicle **14** in which the wireless communication device **36**

20 resides. When the current location **56** is within the first perimeter **140**, the assignment message **32** will be processed. When the current location **56** is not within the first perimeter **140**, the assignment message **32** will be deleted and the driver of the vehicle **14** would never even be aware that it was received. When no

25 reply **38** is received by the dispatch controller **18**, the criteria parameter **62** is set to $N = 2$ corresponding to a second perimeter **144** surrounding the assignment location **66** at a second radius **146** from the assignment location **66**. The second radius **146** is preferably larger than the first radius **142**. When the wireless communication device **36** receives the assignment message **32** including the location parameter **50** and the criteria parameter **62**, it compares the location

30 parameter **50** corresponding with the assignment location **66** to the current location **56** of the vehicle **14** in which the wireless communication device **36** resides. When the current location **56** is within the second perimeter **144**, the

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assignment message **32** will be processed. When the current location **56** is not within the second perimeter **144**, the assignment message **32** will be deleted and the driver of the vehicle **14** would never even be aware that it was received.

When no reply **38** is received by the dispatch controller **18** indicating that no
5 vehicle **14** is located within the second perimeter **144**, the dispatch controller **18** will generate a next criteria parameter ($N = 3$) and continue the process previously described until the reply **38** is received.

In FIG. **16**, the criteria parameter **62** is first set at $N = 1$ to a first driving distance **148** away from the assignment location **66**. Upon receipt of the
10 assignment message **32**, the wireless communication device **36** calculates the driving distance from the current location **56** of the vehicle **14** in which the wireless communication device **36** resides to the assignment location **66** that corresponds to the location parameter **50**. When the calculated driving distance is within the first driving distance **148** set for the criteria parameter **62** the assignment message
15 **32** will be processed. When the calculated driving distance is not within the first driving distance **148** set for the criteria parameter **62**, the assignment message **32** will be deleted and the driver of the vehicle **14** would never even be aware that it was received. When the dispatch controller **18** does not receive the reply **38**, the criteria parameter **62** is set to $N = 2$ corresponding to a second driving distance
20 **150** away from the assignment location **66**. The second driving distance **150** is preferably larger than the first driving distance **148**. Upon receipt of the assignment message **32**, the wireless communication device **36** calculates the driving distance from the current location **56** of the vehicle **14** in which the wireless communication device **36** resides to the assignment location **66** that corresponds
25 to the location parameter **50**. When the calculated driving distance is within the second driving distance **150** set for the criteria parameter **62** the assignment message **32** will be processed. When the calculated driving distance is not within the second driving distance **150** set for the criteria parameter **62**, the assignment message **32** will be deleted and the driver of the vehicle **14** would never even be
30 aware that it was received. When no reply **38** is received by the dispatch controller **18** indicating that no vehicle **14** is located within the second driving distance **150**,

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the dispatch controller 18 will generate a next criteria parameter ($N = 3$) and continue the process previously described until the reply 38 is received.

Preferably, the wireless communication device 36 includes a navigation program for the area in which the fleet 12 operates. The wireless communication device 36 uses the navigation program to calculate the driving distance from the current location 56 to the assignment location 66.

In FIG. 17, the criteria parameter 62 is first set at $N = 1$ to a first travel time 154 equal to the difference between a first arrival time 152 and the current time 76. Upon receipt of the assignment message 32, the wireless communication device 36 calculates its estimated arrival time to the assignment location 66. The current time 76 is subtracted from the estimated arrival time to calculate a travel time. When the calculated travel time of the vehicle 14 is within the first travel time 154 assigned to the criteria parameter 62, the assignment message 32 will be processed. When the calculated travel time is not within the first travel time 154 assigned to the criteria parameter 62, the assignment message 32 will be deleted and the driver of the vehicle 14 would never even be aware that it was received. When the dispatch controller 18 does not receive the reply 38, the criteria parameter 62 is set to $N = 2$ corresponding to a second travel time 158 to the assignment location 66 equal to the difference between a second arrival time 156 and the current time 76. The second travel time 158 is preferably larger than the first travel time 154. Upon receipt of the assignment message 32, the wireless communication device 36 calculates its estimated arrival time to the assignment location 66. The current time 76 is subtracted from the estimated arrival time to calculate a travel time. When the calculated travel time of the vehicle 14 is within the second travel time 158 assigned to the criteria parameter 62, the assignment message 32 will be processed. When the calculated travel time is not within the second travel time 158 assigned to the criteria parameter 62, the assignment message 32 will be deleted and the driver of the vehicle 14 would never even be aware that it was received. When no reply 38 is received by the dispatch controller 18 indicating that no vehicle 14 is located within the second driving distance 150, the dispatch controller 18 will generate a next criteria parameter ($N = 3$) and continue the process previously described until the reply 38 is received.

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